

We claim:

CLAIMS

- 1 1. A method of estimating a channel in a communication system, the method
2 comprising:
3 receiving a block of "n" transmitted symbols, the symbols including pilot
4 symbols and "d" data symbols;
5 estimating a channel using the pilot symbols to create a channel estimate;
6 choosing a group of "m" strongest symbols from the "d" received data
7 symbols;
8 compensating the group of "m" strongest symbols using the channel estimate to
9 create a group of "m" compensated symbols;
10 re-estimating the channel using the group of "m" compensated symbols and pilot
11 symbols; and either:
12 repeating the steps of choosing the group of "m" strongest symbols,
13 compensating the group of "m" strongest symbols and re-estimating the channel,
14 or
15 using a latest channel estimate to compensate all symbols within the
16 block.
- 1 2. The method of claim 1, wherein the communication system is an OFDM
2 communication system.
- 1 3. The method of claim 1, wherein "m" is less than "d".
- 1 4. The method of claim 1, wherein "m" equals "d".
- 1 5. The method of claim 1, wherein the communication system is associated with a
2 multi-antenna receiver.

- 1 6. A method of estimating a channel in a communication system, the method
2 comprising:
3 receiving a block of "n" transmitted symbols, the symbols including pilot
4 symbols and "d" data symbols;
5 estimating a channel using the pilot symbols to create a channel estimate;
6 choosing a group of "m" strongest symbols from the "d" received data
7 symbols;
8 compensating the group of "m" strongest symbols using the channel estimate to
9 create a group of "m" compensated symbols;
10 re-estimating the channel using the group of "m" compensated symbols and pilot
11 symbols; and either:
12 choosing a group of "x" strongest symbols, compensating the group of
13 "x" strongest symbols and re-estimating the channel, or
14 using a latest channel estimate to compensate all symbols within the
15 block.
- 1 7. The method of claim 6, wherein "m" is less than "d".
- 1 8. The method of claim 7, wherein "x" is less than "m".
- 1 9. The method of claim 6, wherein "x" is greater than "m".
- 1 10. The method of claim 6, wherein "d" equals "m" and "m" equals "x".
- 1 11. The method of claim 6, wherein the communication system is associated with an
2 OFDM protocol.
- 1 12. The method of claim 6, wherein the communication system is associated with a
2 multiple antenna receiver.
- 1 13. A method of estimating a channel in a wireless receiver, the method comprising:
2 receiving a block of "n" transmitted symbols, the block including pilot symbols
3 and "d" data symbols;

4 estimating a wireless channel using the pilot symbols to create a channel estimate;
5 choosing a group of “m” strongest data symbols from the “d” received data
6 symbols;
7 compensating the group of “m” strongest symbols using the channel estimate to
8 create a group of “m” compensated symbols;
9 re-estimating the wireless channel using the group of “m” compensated symbols
10 and pilot symbols; and
11 either:
12 repeating the steps of choosing the group of “x” strongest symbols,
13 compensating the group of “x” strongest symbols and re-estimating the channel
14 at least once, or
15 using a latest channel estimate to compensate all data symbols within the
16 block.

1 14. The method of claim 13, wherein “m” equals “x”.

1 15. The method of claim 13, wherein “x” is less than “m”.

1 16. The method of claim 13, wherein “m” equals “d”.

1 17. The method of claim 13, wherein if the steps of choosing a group of “x”
2 strongest symbols, compensating the group of “x” strongest symbols and re-estimating
3 the channel at least once are repeated, the steps are repeated a plurality of times.

1 18. A method of estimating a channel in a communication system, the method
2 comprising:

3 receiving a block of symbols;

4 estimating a channel using at least one of the symbols;

5 choosing a group of symbols from the received symbols;

6 compensating the group of symbols using the channel estimate; and

7 re-estimating the channel using the group of compensated symbols and the at
8 least one of the symbols.

1 19. The method of claim 18, further comprising either:

2 repeating the steps of choosing a group of symbols, compensating the group of
3 symbols and re-estimating the channel, or

4 using a latest channel estimate to compensate all symbols within the block.

1 20. The method of claim 18, wherein the at least one of the symbols is a pilot
2 symbol.

1 21. The method of claim 18, wherein the group of symbols chosen is chosen based
2 on signal strength.

1 22. The method of claim 21, wherein the signal strength of the symbols chosen in
2 the group is associated with a predetermined criteria.

1 23. A method of estimating a channel in a wireless receiver, the method comprising:
2 receiving a block of “n” transmitted symbols, the block including pilot symbols
3 and “d” data symbols;

4 estimating a wireless channel using the pilot symbols to create a channel estimate;

5 choosing a group of “m” strongest data symbols from the “d” received data

6 symbols;

7 compensating the group of “m” strongest symbols using the channel estimate to

8 create a group of “m” compensated symbols;

9 re-estimating the wireless channel using the group of “m” compensated symbols
10 and pilot symbols;

11 determining whether a number of iterations is equal to or greater than T; and

12 if the number is less than T:

13 choosing “x” strongest symbols;

14 compensating the “x” strongest symbols; and

15 repeating the method continuing at the step of re-estimating the channel
16 using the “x” compensated symbols and the pilot symbols; and
17 if the number is equal to or greater than T:
18 using a latest channel estimate to compensate all data symbols within the
19 block.

1 24. A method of estimating a channel in a wireless receiver according to claim 23,
2 further comprising:
3 if “x” is equal to or greater than “m”:
4 setting “m” equal to “x”; and
5 repeating the method from the step of choosing a group of “m” strongest
6 symbols from the “d” received data symbols; and
7 if “x” is less than “m”, continuing the method at the step of choosing “x”
8 strongest symbols.

1 25. A system for performing channel estimation associated with a wireless
2 communication system, the wireless communication system receiving a block of symbols
3 including pilot symbols and data symbols, the channel estimation system comprising:
4 a symbol selector;
5 an initial channel estimator;
6 a symbol compensator; and
7 a channel estimator, wherein the initial channel estimator produces an initial
8 channel estimate using the pilot symbols and the symbol selector chooses a group of “m”
9 strongest data symbols, and wherein the “m” strongest data symbols are compensated
10 using the initial channel estimate and the channel estimator re-estimates the channel
11 using the compensated symbols and the pilot symbols.

1 26. A method of recovering data symbols from a plurality of data sequences using a
2 symbol selector and a symbol compensator, the method comprising:

3 receiving the plurality of data sequences at the symbol selector;
4 choosing a strongest data sequence from the plurality of data sequences;
5 choosing "m" strongest data symbols from the strongest data sequence;
6 choosing "m" data symbols at the same frequency tone positions in at least one
7 unchosen data sequence of the plurality of data sequences; and
8 recovering original symbols from the plurality of data sequences using the "m"
9 strongest data symbols from the strongest sequence and the "m" data symbols from the
10 at least one unchosen data sequence.

1 27. The method of claim 26, wherein the strongest data sequence is chosen
2 according to a signal strength of each of the plurality of sequences.

1 28. A method of choosing data symbols to transmit to a symbol compensator, the
2 method comprising:
3 receiving a plurality of data sequences at a symbol selector;
4 choosing a strongest data sequence from the plurality of data sequences;
5 choosing "m" strongest data symbols from the strongest data sequence;
6 choosing "m" data symbols at the same frequency tone positions in at least one
7 unchosen data sequence of the plurality of data sequences; and
8 transmitting the "m" strongest data symbols from the strongest data sequence
9 and the "m" data symbols from the at least one unchosen data sequence to the symbol
10 compensator.